



## STATEMENT OF BASIS

### OPERATIONS AND CHECKOUT BUILDING SWMU 76 NATIONAL AERONAUTICS AND SPACE ADMINISTRATION KENNEDY SPACE CENTER BREVARD COUNTY, FLORIDA



#### PURPOSE OF STATEMENT OF BASIS

This Statement of Basis (SB) has been developed to inform and give the public an opportunity to comment on the proposed remedy to address contamination at the Operations and Checkout (O&C) Building<sup>1</sup>. A Kennedy Space Center (KSC) Remediation Team consisting of National Aeronautics and Space Administration (NASA) and Florida Department of Environmental Protection (FDEP) personnel has determined that the proposed remedy is cost effective and protective of human health and the environment. However, prior to implementation of the proposed remedy, the KSC Remediation Team would like to give an opportunity for the public to comment on the proposed remedy. At any time during the public comment period, the public may comment as explained in the “How Do You Participate” section of this SB. After the end of the public comment period, the KSC Remediation Team will review all comments and issues raised in the comments and determine if there is a need to modify the proposed remedy prior to implementation.

#### WHY IS A REMEDY NEEDED?

The results of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) indicated that vinyl chloride and iron (Table 1) are present in groundwater, which

could be potentially harmful to human health if this water was used for human consumption now or in the future. In addition, the results of the RFI indicated that several polynuclear aromatic hydrocarbons and polychlorinated biphenyls (PCBs) listed on Table 2 are present in surface soil, which could potentially be harmful to human health.

#### HOW DO YOU PARTICIPATE?

The KSC Remediation Team solicits public review and comment on this SB before implementing the proposed remedy. The remedy for the O&C Building will eventually be incorporated into the Hazardous and Solid Waste Amendments (HSWA) Permit for KSC.

##### THE CLEANUP REMEDY

The proposed cleanup remedy for the O&C Building includes the following components:

- Excavation and disposal of soils impacted by PAHs and PCBs.
- Monitored natural attenuation for groundwater.
- Implementation of institutional controls to prohibit residential exposure to site surface soils and prohibit the use of groundwater as a potable water supply.

The public comment period for this SB and proposed remedy will begin on the date of the publication for notice of availability of the SB in major local newspapers of general

<sup>1</sup> In accordance with RCRA §7004(b), this Statement of Basis summarizes the proposed remedy for the NASA O&C Building. For detailed information on the site, consult the O&C Building RFI Report, which is available for review at the information repository located at the North Brevard Library, 2121 South Hopkins Avenue, Titusville, FL 32780, telephone: (321) 264-5026.

circulation and end 45 days thereafter. If requested during the comment period, the KSC Remediation Team will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy. To request a hearing or provide comments, contact the following person in writing within the 45-day comment period:

Mr. John R. Armstrong, P.G.  
FDEP - Bureau of Waste Cleanup  
2600 Blair Stone Road, MS 4535  
Tallahassee, FL 32399-2400

The HSWA Permit, SB, and associated administrative file, including the Corrective Measures Implementation Work Plan, will be available to the public for viewing and copying at:

NASA Document Library  
North Brevard Library  
2121 South Hopkins Avenue  
Titusville, FL 32780  
Telephone: (321) 264-5026

To request further information, you may contact one of the following people:

Mr. Harold Williams  
Remediation Program Manager  
Environmental Program Office  
Mail Code: TA-C3  
Kennedy Space Center, FL 32899  
E-mail: Harold.G.Williams@nasa.gov  
Telephone: (321) 867-8411

Mr. John R. Armstrong, P.G.  
FDEP-Bureau of Waste Cleanup  
2600 Blair Stone Road, MS 4535  
Tallahassee, FL 32399-2400  
E-mail: John.Armstrong@dep.state.fl.us  
Telephone: (850) 245-8981

## **FACILITY DESCRIPTION**

NASA established the KSC as the primary launch site for the space program. These operations have involved the use of toxic and hazardous materials. Under the RCRA and applicable HSWA permit (Permit No. FL6800014585) issued by the FDEP, KSC was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 76, the O&C Building.

## **SITE DESCRIPTION AND HISTORY**

The O&C Building is NASA-operated facility that was constructed in the early 1960s to support space flight efforts at KSC. The facility includes the O&C Building and numerous appurtenant structures and storage areas that comprise an area of approximately 38 acres. The O&C Building location is shown on Figure 1. The facility houses offices, laboratories, a fitness center, astronaut quarters, and an assembly and test bay. During the 1960s and 1970s the O&C assembly bay was used for the assembly and testing of the Apollo Spacecraft. The O&C bay has since been retrofitted and is now used to process payloads for the Space Shuttle program and integrated testing of components for the International Space Station.

Investigations conducted at the site include:

- 1995 – 1999: Site assessment and Confirmation Sampling (CS) activities were focused on identifying potential contamination in soil and groundwater near the cooling towers. Results indicated that petroleum hydrocarbons were present in soil and metals were present in groundwater.
- 1995-2000: Various investigations were conducted to evaluate the composition of liquid and sludge on the floor in the

basement of the O&C Building. The samples contained various metals, PCBs, and low-level VOCs. The SGS Spill Cleanup Team performed a comprehensive decontamination of the floor in Room 100 of the east tunnel in January 2001.

- 1996 – 1999: Site assessment and CS activities were focused on identifying potential contamination in soil and groundwater from the former sludge residuals disposal area on the O&C Building front lawn. Results indicated the presence of copper in soil and vinyl chloride in groundwater.
- 2000-2001: The SWMU Assessment for the O&C Building focused on confirming previous detections at the site and evaluating the presence or absence of contamination in areas not previously investigated. Results indicated arsenic, PCBs, PAHs, and copper were present in soil. Metals (aluminum, iron, and arsenic) and vinyl chloride were present in groundwater. An RFI Work Plan for the site was approved in 2002.
- 2002-2003: The RFI was conducted to characterize the nature and extent of contamination at the site. Samples of soil, surface water and groundwater were collected and analyzed to evaluate potential risks to human health and ecological receptors. RFI results indicated that elevated levels of PCBs were present in the soil adjacent to the former transformer pad, PAHs were present in soils between the building wings, and vinyl chloride and iron were present in groundwater. A Preliminary Risk Evaluation (PRE) was performed for soil and groundwater. The PRE for soil was performed as if soil excavations were complete (virtual PRE). The PRE for soil indicated that once

corrective measures are completed to remove surface soils impacted by PCBs and PAHs, the potential cancer risk for an industrial receptor is below FDEP's threshold. The PRE for groundwater indicated unacceptable human health risk if the groundwater was used as a source of drinking water. The ecological risk assessment (ERA) indicated that no unacceptable risk exists at the site for ecological receptors.

### SUMMARY OF SITE RISK

As part of the RFI activities, risk assessments were completed in accordance with KSC's Remediation Team Risk Assessment Decision Process Document (DPD). The ERA was performed in accordance with the eight-step process described in the EPA's "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments", dated 1997.

Chemicals of Concern (COCs) identified for human health during the RFI included vinyl chloride and iron in groundwater and PAHs and PCBs in soil. Table 1 lists the COCs present in groundwater at the site. Table 2 lists the COCs present in soil at the site. The PRE for human health indicated that groundwater containing vinyl chloride would result in an unacceptable human health risk if the groundwater was used as a source of drinking water. Unacceptable risks to potential future residential receptors were identified for exposure to soils between the building wings; therefore, implementation of institutional controls to prohibit residential exposure to site surface soils in this area is required. The ERA performed for soil and surface water indicated that no unacceptable risk exists at the site for ecological receptors.

## WHAT ARE THE REMEDY OBJECTIVES AND LEVELS?

The remedial action objective (RAO) is to limit the site to industrial uses and protect humans from exposure to groundwater by preventing its use as a drinking water source in the shallow aquifer where contaminant concentrations are higher than regulatory standards. Table 1 lists the COCs present in groundwater at the O&C Building. The first column lists the chemical name, the second column lists the range of concentrations in groundwater detected at the O&C Building based upon RFI groundwater sampling results, and the last column presents the FDEP cleanup target level to be achieved at the site. Table 2 lists the COCs present in soil at the O&C Building. The first column lists the chemical name, the second column lists the range of concentrations in soil detected at the O&C Building based upon RFI soil sampling results, and the last column presents the FDEP cleanup target level to be achieved at the site.

Table 1

Site-Related Chemicals of Concern (COCs)	Range of Detections <sup>1</sup> (µg/L)	Site-Specific Cleanup Level <sup>2</sup> (µg/L)
Vinyl chloride	2.6 – 6.6	1
Iron	7,200 – 14,000	2,700 <sup>3</sup>

<sup>1</sup> Detections in monitoring wells

<sup>2</sup> Cleanup levels are GCTLs from Florida Administrative Code 62-777

<sup>3</sup> KSC Background

Table 2

Site-Related Chemicals of Concern (COCs)	Range of Detections (mg/kg)	Residential SCTL <sup>1</sup>	Industrial SCTL <sup>1</sup>
PCBs	0.01 - 43	0.5	2.1 <sup>2</sup>
Benzo(a)anthracene	3.1 - 6.9	1.4	5.0
Benzo(a)pyrene	0.072 – 5.2	0.1	0.5
Dibenzo(a,h)anthracene	0.02 – 1.2	0.1	0.5

<sup>1</sup> Cleanup levels are SCTLs from Florida Administrative Code 62-777

<sup>2</sup> Industrial SCTL is for Total PCBs

## REMEDIAL ALTERNATIVES FOR THE O&C BUILDING

Because of the very limited nature of the soil and groundwater contamination, only one alternative was considered for the O&C Building and is summarized below.

- Excavation and off-site disposal of soil with PCB and/or PAHs greater than the FDEP Industrial SCTL;
- Monitored Natural Attenuation (MNA) of Groundwater; and
- Institutional Controls.

**Excavation & Off-Site Disposal:** The areas to be excavated are shown on Figure 2. The horizontal and vertical extent of each excavation area was determined based upon sampling data collected during the RFI. The RAO for soil is the FDEP Industrial SCTL. Excavated soil will be placed into roll-off containers and then each roll-off container will be weighed, manifested, and transported to a Subtitle D landfill.

**Monitored Natural Attenuation:** MNA entails the use of natural processes (chemical, physical, and biological) to reduce chlorinated VOC (CVOC) concentrations. Chemical MNA processes include volatilization, sorption, and hydrolysis. Physical MNA processes include dilution due to infiltration, advection, and dispersion. Biological MNA processes include biological consumption due to electron acceptor reactions (reductive dehalogenation), electron donor reactions and cometabolism. All of these processes combine to reduce CVOC concentrations over time. Groundwater will be regularly sampled and analyzed to monitor and document the decrease in contaminant concentrations.

**Institutional Controls:** In addition to active remediation, institutional controls will be

implemented for site soil and groundwater. The institutional controls will prohibit residential exposure to site surface soil and prohibit the use of groundwater as a potable water supply. NASA, EPA and FDEP have entered into a Memorandum of Agreement (MOA), which outlines how institutional controls will be managed at NASA<sup>2</sup>. The MOA requires periodic inspections, condition certification, and agency notification. The areas of the site that will be under institutional control are shown on Figure 3.

### EVALUATION OF REMEDY

The remedy was evaluated to determine if it will comply with EPA's four threshold criteria for corrective measures. The four threshold criteria for corrective measures are:

- overall protection of human health and the environment;
- attain media cleanup standards;
- control the sources of releases; and
- comply with standards for management of wastes.

The five balancing criteria are:

- long term reliability and effectiveness;
- reduction in the toxicity, mobility, or volume of wastes;
- short term effectiveness;
- implementability; and
- cost.

Excavation of soil coupled with MNA for groundwater, and institutional controls was determined by the KSC Remediation Team to be the best overall remedial approach.

### WHAT IMPACTS WOULD THE REMEDY HAVE ON THE LOCAL COMMUNITY?

There would be no impacts to the local community because groundwater is not used for potable water at KSC.

The proposed remedy includes administrative actions to limit the use of groundwater until the cleanup levels have been reached. Long term groundwater monitoring will be used to monitor and document reduction in contamination concentrations to the cleanup target levels.

The institutional controls will also prevent exposure to contaminants prior to the cleanup levels being achieved. The proposed remedy meets the four general standards for corrective measures and was determined to be the best overall approach.

### WHY DOES THE KSC REMEDIATION TEAM RECOMMEND THIS REMEDY?

The team recommends the proposed remedy because the institutional controls will prevent exposure to contaminants prior to the cleanup levels being achieved. The proposed remedy meets the four general standards for corrective measures and was determined to be the best overall approach.

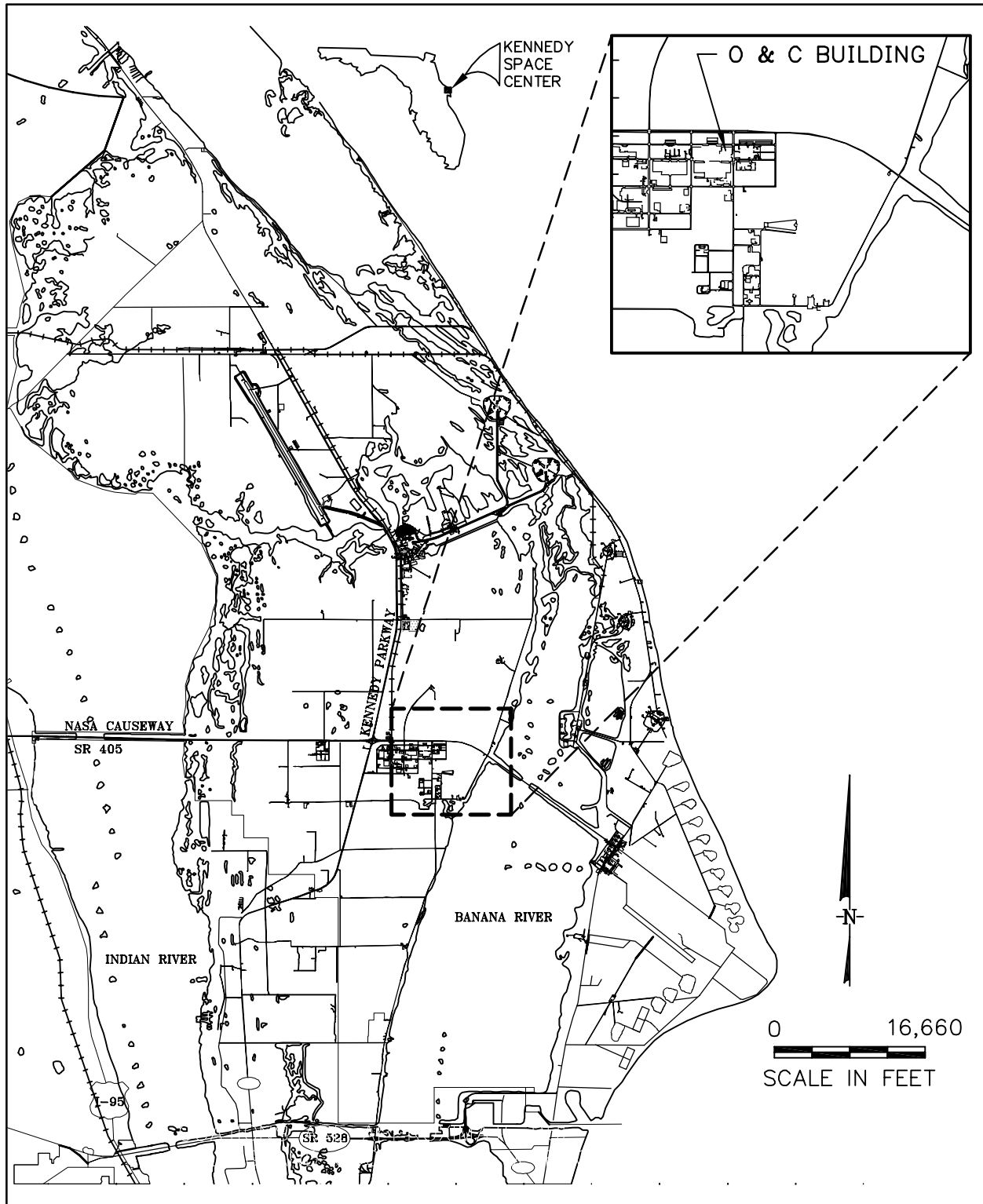
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2. By separate MOA effective February 23, 2001, with the EPA and FDEP, KSC, on behalf of NASA, agreed to implement Center-wide, certain periodic site inspections, condition certification, and agency notification procedures designed to ensure the maintenance by Center personnel of any site-specific LUCs deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that agreement was that through the Center's substantial good faith compliance with the procedures called for herein, reasonable assurances would be approved to EPA and FDEP as to the permanency of those remedies which included the use of specific LUCs.

Although the terms and conditions of the MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed by NASA KSC, EPA and FDEP that the contemplated permanence of the remedy reflected herein shall be dependent upon the Center's substantial good faith compliance with the specific LUC maintenance commitments reflected herein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred in may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment.

**NEXT STEPS**

The KSC Remediation Team will review all comments on this SB to determine if the proposed remedy needs modification prior to implementation and prior to incorporating the proposed remedy into KSC's HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then the Corrective Measure will be initiated, and a Land Use Control Implementation Plan will be developed to incorporate the institutional controls at this site.



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Figure 1  
O & C Building (SWMU 76)  
Location Map



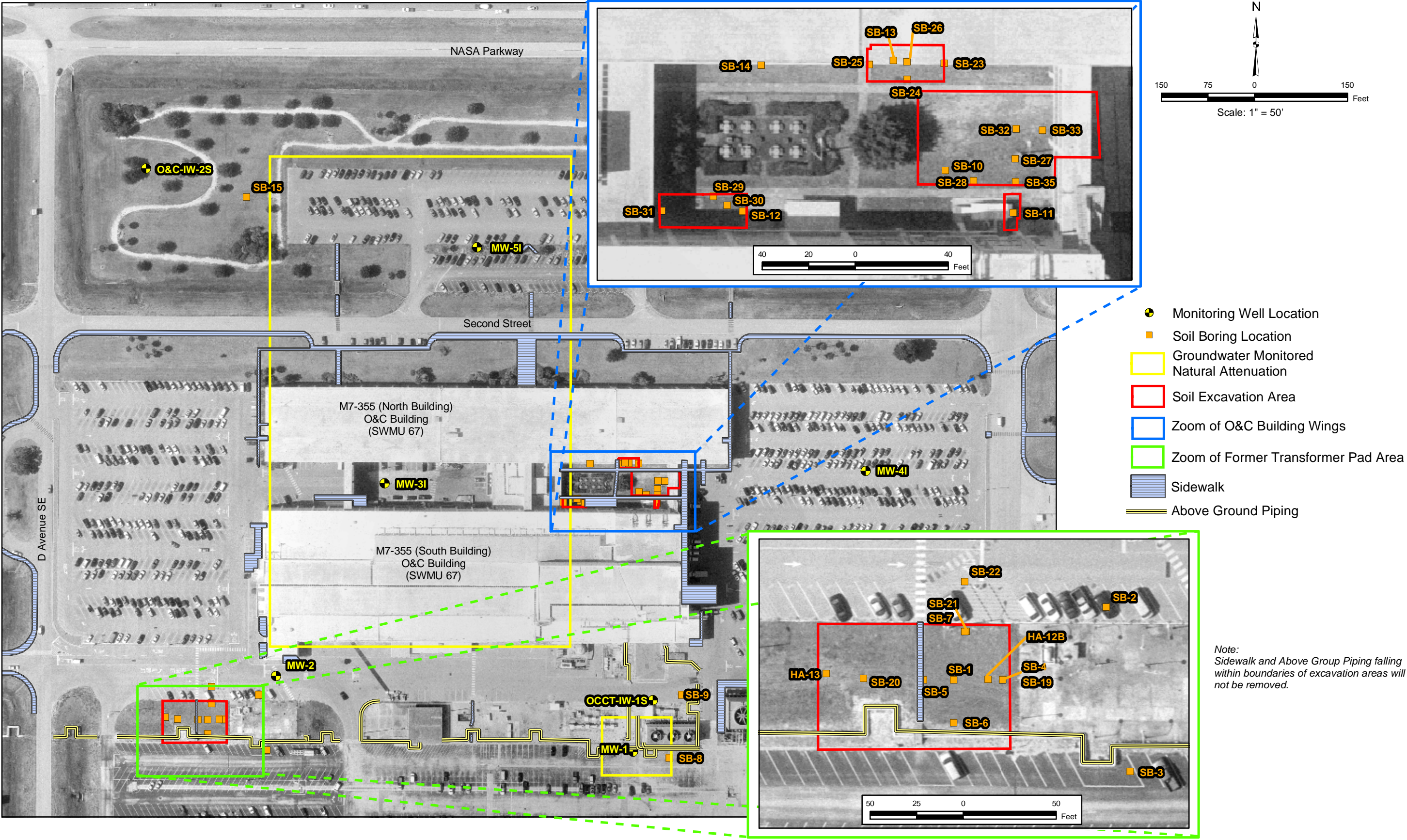


Figure 2  
Proposed Soil Excavation Areas and Groundwater  
Monitored Natural Attenuation Area  
Operations and Checkout (O & C) Building (SWMU 76)



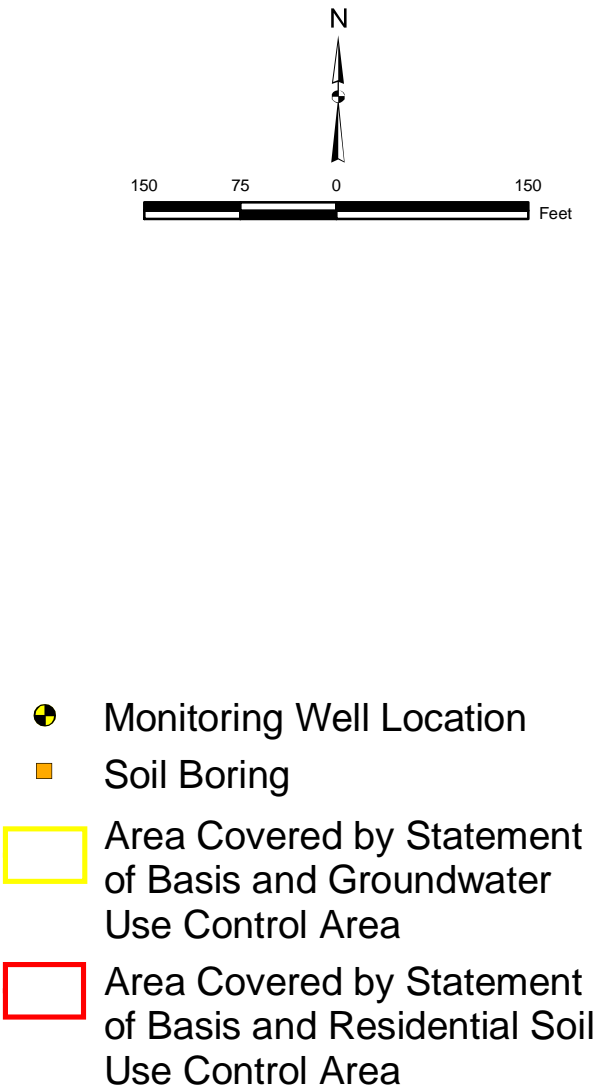
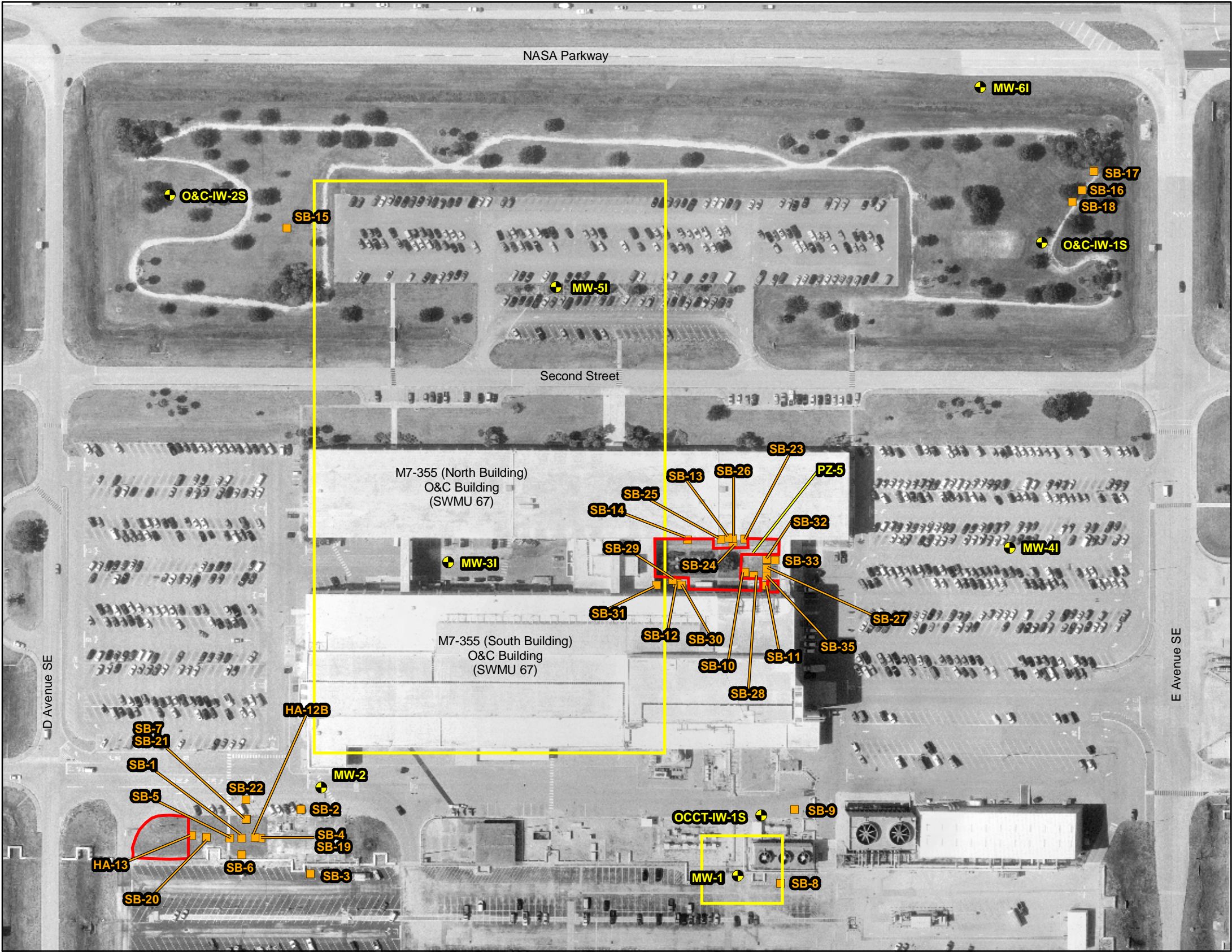


Figure 3  
Land Use Control Areas  
Operations and Checkout (O & C) Building (SWMU 76)